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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/589,064	06/08/2000	Nobuhiro Tani	P19212	1395

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EXAMINER	
LONG, HEATHER R	
ART UNIT	PAPER NUMBER
2615	6

DATE MAILED: 02/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/589,064	TANI, NOBUHIRO	
	Examiner	Art Unit	
	Heather R Long	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-21* is/are rejected.

7)☒ Claim(s) *14 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4,5*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-8, 10-13, and 15-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Numazaki et al. (U.S. Patent 6,292,169).

Regarding claim **1**, Numazaki et al. discloses a three-dimensional image capturing device, comprising: a light source (3) that radiates a distance measuring light beam irradiating a measurement subject, the measurement subject reflecting the distance measuring light beam to generate a reflected light beam; a plurality of first photoelectric conversion elements (odd lines) and second photoelectric conversion elements (even lines), arranged in a predetermined direction, that receive the reflected light beam, so that electric charge corresponding to an amount of the received reflected light beam is

accumulated in each of the first and second photoelectric conversion elements (odd and even lines); a first electric charge holding unit disposed adjacent to each of the first photoelectric conversion elements (odd lines); a second electric charge holding unit disposed adjacent to each of the second photoelectric conversion elements (even lines); a first electric charge transfer processor (9) that transfers first electric charge accumulated in the first photoelectric conversion elements (odd lines) to the first electric charge holding unit with first electrodes connected only to the first electric charge holding unit; a second electric charge transfer processor (9) that transfers second electric charge accumulated in the second photoelectric conversion elements (even lines) to the second electric charge holding unit with second electrodes connected only to the second electric charge holding unit; and an electric charge integrating processor that drives the first electric charge transfer processor repeatedly, so that the first electric charge relating to distance information of the measurement subject is integrated in the first electric charge holding unit (col. 6, lines 5-13 and 36-41; col. 7, lines 15-17; col. 7, line 25 – col. 8, line 7; col. 8, lines 56-63).

Regarding claim **2**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, comprising: a first electric charge discharging processor that discharges unwanted charge accumulated in each of the first photoelectric conversion elements (odd lines) (S106), so that an accumulating operation of electric charge is started in each of the first photoelectric conversion elements (odd lines); a second electric charge discharging processor that discharges

unwanted charge accumulated in each of the second photoelectric conversion elements (even lines) (S103), so that an accumulating operation of electric charge is started in each of the second photoelectric conversion elements (even lines); and wherein the electric charge integrating processor is operated by driving the first electric charge discharging processor and the first electric charge transfer processor alternately (col. 9, lines 5-24).

Regarding claim **3**, Numazaki et al. discloses in Fig. 10A a three-dimensional image capturing device, wherein the first photoelectric conversion elements (odd lines) and the second photoelectric conversion elements (even lines) are formed on a substrate, and the first electric charge discharging processor discharges the unwanted charge to the substrate.

Regarding claim **4**, Numazaki et al. discloses in Fig. 3 a three-dimensional device, wherein the first and second electric charge holding units are provided in a vertical transfer unit that outputs the electric charge from the three-dimensional image capturing device.

Regarding claim **5**, Numazaki et al. discloses a three-dimensional image capturing device, wherein the first photoelectric conversion elements (odd lines) are arranged in a predetermined direction with a predetermined number of the second photoelectric conversion elements (even lines) in between (col. 6, lines 36-41).

Regarding claim **6**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, wherein the first electric charge discharging processor

outputs an electric charge discharging signal to discharge the unwanted charge (S106), and the first electric charge holding processor outputs a first electric charge transfer signal to transfer the first electric charge to the first electric charge holding unit (S012), and the second electric charge holding processor outputs a second electric charge transfer signal to transfer the second electric charge to the second electric charge holding unit (S105), the electric charge discharging signal and the first and second electric charge transfer signals being pulse signals (col. 9, lines 5-45).

Regarding claim **7**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, wherein the first electric charge, corresponding to at least distance information of the measurement subject, accumulates in the first photoelectric conversion elements (odd lines) until a receiving of the reflected light beam by the first photoelectric conversion elements ends (S104) (col. 8, line 56 – col.9, line 33).

Regarding claim **8**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, wherein the first electric charge, corresponding to at least distance information of the measurement subject, starts to accumulate in the first photoelectric conversion elements (odd lines) when an output of the electric charge discharging signal ends (S100) (col. 8, lines 51-55).

Regarding claim **10**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, comprising: a radiating operation control processor (2 and S104) that prohibits a radiation of the distance measuring light

beam from being radiated from the light source (3); and an image information sensing processor that drives the first and second electric charge discharging processors and the first and second electric charge transfer processors, on condition that the radiation of the distance measuring light beam prohibited by the radiating operation control processor (2), so that the first and second electric charge corresponding to an image information of the measurement subject is transferred to the first and second electric charge holding units respectively.

Regarding claim **11**, Numazaki et al. discloses a three-dimensional image capturing device, comprising: a light source (3) that radiates light irradiating a measurement subject; a plurality of optical sensors that generate electric charge corresponding to an amount of light received by the optical sensors and is separated into predetermined groups (odd and even lines); electric charge transfer electrodes that are applied to each of the optical sensors in order to transport the electric charge generated in the optical sensors to the outside of the optical sensors; an electric charge transfer unit that holds the electric charge transferred from the optical sensors by the electric charge transfer electrodes and transports the electric charge held in the electric charge transfer unit; an electric charge transfer electrode control processor (5) that can control each the group of the electric charge transfer electrodes independently; and an electric charge accumulating processor (9) that repeatedly drives the electric charge transfer electrode control processor (5) and repeatedly transfers electric charge generated in certain the groups of the optical sensors, so that transferred electric

charge accumulates in the electric charge transfer unit (col. 6, lines 5-13 and 36-41; col. 7, lines 15-17; col. 7, line 25 – col. 8, line 7; col. 8, lines 56-63).

Regarding claim **12**, Numazaki et al. discloses in Figs. 2 and 3 a three-dimensional image capturing device, comprising: a light source (3) that radiates a distance measuring light beam irradiating a measurement subject, the measurement subject reflecting the distance measuring light beam to generate a reflected light beam; a plurality of photoelectric conversion elements that receive the reflected light beam, so that electric charge corresponding to an amount of the received reflected light beam is accumulated in each of the photoelectric conversion elements, and is disposed in a matrix arrangement; a vertical transfer unit that is disposed along each vertical line of the photoelectric conversion elements, so that the electric charge accumulated in the photoelectric conversion elements is transferred in a vertical direction; a horizontal transfer unit that is disposed nearby one end of the vertical transfer unit and in parallel with horizontal lines of the photoelectric conversion elements, so that the electric charge is transferred in a horizontal direction; a electric charge transfer processor that transfers electric charge accumulated only in photoelectric conversion elements comprising effective horizontal lines, which are disposed every predetermined number of the horizontal lines; an electric charge integrating processor that drives the electric charge transfer processor repeatedly and integrates the electric charge accumulated in the photoelectric conversion elements comprising the effective horizontal lines, in the vertical transfer unit;

and a transfer operation control processor that controls the horizontal transfer unit and the vertical transfer unit, so that the horizontal transfer unit is driven only when the electric charge corresponding to the effective horizontal lines is transferred to the horizontal transfer unit (col. 6, lines 5-13 and 36-41; col. 7, lines 15-17; col. 7, line 25 – col. 8, line 7; col. 8, lines 56-63).

Regarding claim **13**, Numazaki et al. discloses a three-dimensional image capturing device, wherein the horizontal lines are separated into a plurality of groups (odd and even lines) and the effective horizontal lines are composed of one of the groups or combination of the groups (col. 6, lines 36-41).

Regarding claim **15**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, comprising an electric charge discharging processor (S103) that starts accumulation of the electric charge in the photoelectric conversion elements by discharging unwanted charge accumulated in the photoelectric conversion elements, and wherein the electric charge integrating processor is operated by driving the electric charge discharging processor and the electric charge transfer processor alternatively (S100, S102, S103, S105, S106).

Regarding claim **16**, Numazaki et al. discloses in Fig. 10A a three-dimensional image capturing device, wherein the photoelectric conversion elements are formed on a substrate, and the electric charge discharging processor discharges the unwanted charge to the substrate.

Regarding claim **17**, Numazaki et al. discloses in Fig. 9 a three-

dimensional image capturing device, wherein accumulation of electric charge corresponding to at least distance information of the measurement subject starts in the photoelectric conversion elements (odd lines) when an output of an electric discharging signal (S100 or S106), which discharges the unwanted charge in the electric charge discharging processor, ends.

Regarding claim **18**, Numazaki et al. discloses in Fig. 9 a three-dimensional image capturing device, wherein the light source (3) radiates a pulsed beam of the distance measuring light beam during a first accumulating period (S101), which is from an output of the electric charge discharging signal (S100 or S106) to an output of the electric charge transfer signal (S102), and the electric charge corresponding to distance information regarding the measurement subject is integrated in the vertical transfer unit of the effective horizontal lines (S102).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Numazaki et al. (U.S. Patent 6,292,169).

Regarding claim **9**, Numazaki discloses a three-dimensional image capturing device, wherein the light source that radiates a distance measuring light beam during a first accumulating period, which is from an output of the electric charge discharging signal to an output of the first electric charge transfer signal, and the first electric charge corresponding to distance information regarding the measurement subject is integrated in the first electric charge holding unit. Numazaki fails to disclose that the light source radiates a pulsed beam. However, Official Notice is taken that both the concept and the advantages of using a light source that radiates a pulsed beam are well known and expected in the art. It would have been obvious to use a light source with a pulsed beam in order to provide a light with more coherent wavelengths.

6. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numazaki et al. (U.S. Patent 6,292,169) as in view of Umeda et al. (U.S. Patent Application Publication 2002/0145669).

Regarding claim **19**, Numazaki et al. discloses a three-dimensional image capturing device, comprising: a light source (3) that radiates light irradiating a measurement subject; a plurality of photoelectric conversion elements that can accumulate electric charge corresponding to an amount of light received by the photoelectric conversion elements, and disposed in a matrix arrangement; a electric charge transfer control processor (9) that controls an electric transfer operation, which outputs electric charge accumulated in the photoelectric conversion elements to the outside of the photoelectric conversion elements; a

distance calculating processor that calculates a distance (6), from the photoelectric conversion element to the measurement subject, from an amount of electric charge accumulated in the photoelectric conversion elements from light reflected by the measurement subject and received in the photoelectric conversion elements; and a first distance measuring processor that drives the electric charge transfer control processor in order to output electric charge accumulated in all the photoelectric conversion elements, and calculates distances corresponding to all the photoelectric conversion elements by means of the distance calculating processor (col. 6, lines 5-13 and 36-41; col. 7, lines 15-17; col. 7, line 25 – col. 8, line 7; col. 8, lines 56-63). However, Numazaki et al. fails to disclose a second distance measuring processor that drives the electric charge transfer control processor in order to output electric charge accumulated in selected photoelectric conversion elements, and calculates distances corresponding to the selected photoelectric conversion elements by means of the distance calculating processor.

Referring to the Umeda et al. reference, Umeda et al. discloses a camera wherein a processor drives the electric charge transfer control processor in order to output electric charge accumulated in all the photoelectric conversion elements and the processor drives the electric charge transfer control processor in order to output electric charge accumulated in selected photoelectric conversion elements according to the selected mode (paragraphs [0170], [0171], and [0175]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a processor that drives the electric charge transfer control processor in order to output electric charge accumulated in all or only selected photoelectric conversion elements as disclosed by Umeda et al. in the three-dimensional image capturing device disclosed by Numazaki et al. in order to allow the pixel output order or read out order to be changed according to an external command.

Regarding claim **20**, Numazaki et al. in view of Umeda et al. as combined in claim 19 discloses a three-dimensional image capturing device, comprising a distance measurement selecting processor that selects either the first or second distance measuring processor and drives the selected processor. Umeda et al. discloses selecting between the first and second read out methods (paragraphs [0170], [0171], and [0175]).

Regarding claim **21**, Numazaki et al. discloses a three-dimensional image capturing device, wherein the first distance measuring processor is for measuring a stationary measurement subject and the second distance measuring processor is for measuring a moving measurement subject.

Allowable Subject Matter

7. Claims 14 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: prior art fails to teach or suggest: a three-dimensional camera:

a. wherein the horizontal lines are separated into first, second and third groups, and an arrangement of the first, second and third groups in vertical direction is a repetition of a "first, second, second, third, second, second" order (claim 14).

b. wherein the photoelectric conversion elements comprise first photoelectric conversion elements and second photoelectric conversion elements a number of the second photoelectric conversion elements being less than that of the first photoelectric conversion elements, and the second distance measuring processor comprising; a first high speed mode that drives the electric charge transfer control processor so as to output electric charge from the first photoelectric conversion elements and calculates the distance corresponding to the first photoelectric conversion elements; a second high speed mode that drives the electric charge transfer control processor so as to output electric charge from the second photoelectric conversion elements and calculates the distance corresponding to the second photoelectric conversion elements; and wherein the distance is calculated with the first high speed mode when the measurement subject is moving at a relatively slow speed, and with the second high speed mode when the measurement subject is moving at a relatively fast speed (claim 22).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Malek (U.S. Patent 4,915,498) discloses a range imaging sensor that discloses a device wherein the light source produces a pulsed beam in order to help determine the range of an object.

b. Yamasaki (U.S. Patent 5,627,586) discloses a moving body detection device of a camera capable of easily selecting a desired area from a wide area of the image plane of an image of the camera, detecting slowly and rapidly moving objects.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather R Long whose telephone number is 703-305-0681. The examiner can normally be reached on Mon. - Thurs.: 7:00 am - 4:30 pm, and every other Fri.: 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

HRL
January 29, 2004

NGOC YEN VU
PRIMARY EXAMINER